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EXAMINER	
KRAMSKAYA, MARINA	

ART UNIT	PAPER NUMBER
2858	

DATE MAILED: 05/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/643,351	LOUCKS, DAVID G.	
	Examiner	Art Unit	
	Marina Kramskaya	2858	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 February 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7 & 10-20* is/are rejected.

7)☒ Claim(s) *8 and 9* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *8/19/2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1, 2, & 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Jurisch, US 6,448,780, in view of Vokey et al., US 4,947,469 and Godo et al, US 6,225,810.

As per Claims 1 & 14 Jurisch discloses a method of determining the impedance across a in a section of an energized power distribution system **1** using the energizing power (i.e. "a power-supply line through which ac current is flowing", ABS, lines 1-2), the method comprising:

- measuring a first voltage ($\mathbf{U_s(t_n)}$ by **2**) produced by the energizing power at a first end of the section (at point of **4**) of the energized power system (FIG. 1);
- measuring current ($\mathbf{Is(t_n)}$ by **2**)through the section of the energized power system (FIG. 1) produced by the energizing power;
- determining the impedance $\mathbf{R(t_n)}$ as a power $\mathbf{P(t_n)}$ divided by the current $\mathbf{I(t_n)}$, (column 4, line 15).

Jurisch does not disclose

- a section of an energized power distribution system containing a pressure junction;
- measuring a second voltage produced by the energizing power at a second end of the section of the energized power system;
- determining the impedance as a difference between first voltage and second voltage divided by the current.

Vokey discloses:

- measuring a second voltage (**V(b),** by **14B**) produced by the energizing power at a second end of the section of the energized power system;
- determining the impedance **R(a)** as a difference between first voltage **V(a)** and second voltage **V(b)** divided by the current **I(a)**.

Godo discloses measuring an impedance across a pressure junction (i.e. joint, see FIG. 12-14).

Therefore, it would have been obvious to a person of ordinary skill in the art to measure the impedance in terms of a voltage difference divided by the current, as taught by Vokey, rather than the method of Jurisch where the impedance is determined by dividing the power by the current, in order to simplify the steps of calculation. Further, it would have been obvious to a person of ordinary skill in the art to measure the impedance in a section of a power distribution system containing a pressure junction, as taught by Godo, in the method and apparatus of Jurisch, in order to monitor a junctions suspect of fault (Godo, column 4, lines 7-10).

As per claim 2, Jurisch, as modified, discloses a method of determining the impedance across a in a section of an energized power distribution system as applied to Claim 1 above. Jurisch further discloses summing the current for a specified number of measurements (in the instant case k times, wherein k is 10, column 4, lines 1-5).

Jurisch does not disclose:

measuring of the first voltage, the second voltage and the current is performed repeatedly multiple times, and wherein determining the impedance of the section of the power distribution system comprises summing a difference between the first and second voltages to generate a summed voltage difference and summing the current to generate a summed current for a selected number of measurements of the first voltage, the second voltage and the current, and dividing the summed voltage difference by the summed current to generate the impedance.

Vokey further discloses:

measuring of the first voltage **V(a)**, the second voltage **V(b)** and the current **I(a)** is performed repeatedly multiple times, and wherein determining the impedance of the section of the power distribution system comprises summing a difference between the first and second voltages to generate a summed voltage difference and summing the current to generate a summed current for a selected number of measurements **N** of the first voltage, the second voltage and the current, and dividing the summed voltage difference by the summed current to generate the impedance (column 3, lines 41-43) and eq. 1, line 52, where **N** is the number of measurements taken.

Therefore, it would have been obvious to a person of ordinary skill in the art to conduct the measurement of the voltage and current a selected number of times and then summing the voltage difference measurements and summing the current measurements, and dividing the summed voltage difference by the summed current to generate the impedance, as taught by Vokey, in the measurement method of Jurisch, in order to have sampled values for determination of an impedance at a time t (Jurisch, column 4, lines 7-9).

As per Claims 3 & 15, Jurisch, as modified, discloses the method of determining impedance as applied to Claims 2 & 14 above. Jurisch further discloses the energized power distribution system being an AC (ABS., lines 1-3) power distribution system in which the voltages (including **U(t)** & $\mathbf{U_s(t_n)}$, and the current $\mathbf{I_s(t_n)}$ are all AC (ABS., lines 5-6) and wherein the measuring of the first ac voltage, the second ac voltage and the ac current are performed substantially simultaneously (by **2**).

As per Claims 4 & 17, Jurisch, as modified, discloses the method of determining impedance as applied to Claims 2 & 14 above.

Jurisch, as modified, does not discloses squaring the sums of voltage differences or squaring the sums of the current, and then dividing the summed voltage difference squared by the summed current squared to generate a representation of the impedance.

Godo discloses summing the voltages squared (column 5, lines 2-3, in eq. 6) and summing the currents squared (column 4, line 55, in eq. 5), then dividing the summed product of voltage and current by the summed current squared to generate a representation of the impedance (column 4, line 55, in eq. 5).

Therefore, it would have been obvious to a person of ordinary skill in the art to change the equation to the sum of voltage difference squared divided by the sum of current squared, as taught by the applicant, since there are numerous representations of impedance are acceptable in the art. Therefore, it would have been obvious to square the sums of voltages and currents, as taught by Godo, in the summed voltages and currents equation of Jurisch, in order to provide an averaging process of the sampled currents and voltage differences (column 5, lines 15-17).

As per Claim 5, Jurisch, as modified, discloses the method of determining impedance as applied to Claim 4 above.

Jurisch, as modified, does not disclose repeating the calculations of the impedance, as in claim 4 above, to generate successive values of the impedance and including limiting changes in the successive values of the impedance.

Godo further discloses repeating the measuring process (column 6, line 56) to calculate the impedance.

Therefore, it would have been obvious for a person of ordinary skill in the art to repeat the measuring process in order to monitor the changes in the calculated values

of impedance. Further, it is well known in the art to repeat and record successive values of data, the impedance in this case, and note the changes in the data.

As per Claims 6, 18, 19, Jurisch, as modified, discloses the method of determining impedance as applied to Claims 5 & 17 above.

Jurisch, as modified, does not disclose limiting changes in successive values of impedance comprises changing the impedance to a preceding value of the impedance plus a value X when the impedance is more than the preceding value of the impedance, and changing the impedance to the preceding value of impedance minus the value X when the impedance is less than the preceding value of the impedance.

Godo further discloses replacing the preceding value of the impedance by adding a value (column 3, line 26, eq. 3).

Therefore, it would be obvious to subtract the value of X when the impedance is less than the preceding value of the impedance, since the value of X is a compensating value and must be used accordingly. It would have been obvious to a person of ordinary skill to compensate for the variations in the calculated impedances as taught by Godo (eq. 3), in the impedance determining method of Jurisch, in order to stabilize the output values of the successive impedance measurements.

As per Claims 7 & 20, Jurisch, as modified, discloses the method of determining impedance as applied to Claims 5 & 18 above.

Jurisch, as modified, does not disclose generating the value X by multiplying a selected gain by an initial value of the impedance.

Godo further discloses generating the value X by multiplying a selected gain by an initial value of the impedance (column 3, line 26, eq. 3 & 4).

Therefore, it would have been obvious to a person of ordinary skill in the art to calculate X by multiplying the gain by the initial value of the impedance, as taught by Godo, in order to compensate for the output values of the successive impedance measurements.

As per Claim 13, Jurisch, as modified, discloses the method of determining impedance as applied to Claim 1 above. Jurisch further discloses a power distribution system that is an AC power distribution system energized by AC power such that the first voltage, the second voltage and the current are all AC (ABS., lines 1-5).

Jurisch, as modified, does not disclose calculating a transformer ratio from the first AC voltage and the second AC voltage when the first ac voltage and the second AC voltage differ by a selected amount and applying the transformer ratio to one of the first AC voltage and the second AC voltage before determining the impedance.

Godo discloses an AC power distribution system where the first voltage, second voltage, and current are all AC, and calculating a transformer ratio (N_S/N_D) from the first ac voltage V_S and the second ac voltage V_D when the first ac voltage and the second ac voltage differ by a selected amount and applying the transformer ratio to one of the

first ac voltage and the second ac voltage before determining the impedance (column 3, lines 49-54).

Therefore, it would have been obvious for a person of ordinary skill in the art to calculate the transformer ratio and apply the ration before determining impedance, as taught by Godo, in the impedance measuring method of Jurisch, in order to check for the proper closing of couplers (column 3, line 58).

As per claim 16, Jurisch, as modified, discloses an apparatus of determining the impedance across a section of an energized power distribution system as applied to Claim 14 above. Jurisch further disclose the means **2** for measuring the first voltage, the means **2** for measuring the AC current, measure the first voltage $\mathbf{U_s(t_n)}$, and the current $\mathbf{I_s(t)}$ repeatedly (k times, in the instant case k=10).

Jurisch does not disclose the means for determining impedance, comprising means for repetitively calculating the impedance from the selected number of measurements of the first voltage, the second voltage, and the current.

Vokey discloses the means for repeatedly calculating the impedance from the voltage and current measurements (column 3, lines 41-43).

Therefore, it would have been obvious to a person of ordinary skill in the art to, calculate the impedance repetitively, as taught by Vokey in the impedance measuring apparatus of Jurisch, in order to arrive at statistical certainty for the measured impedance values (Vokey, column 3, lines 41-43).

2. Claims 10 & 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jurisch, in view of Vokey et al. and Godo et al., as applied to Claim 1 above, and further in view of Ball, US 4,954,782.

As per Claims 10 & 11, Jurisch as modified, discloses the method of determining impedance as applied to Claim 1 above. Jurisch further discloses taking a voltage measurements $\mathbf{U_s(t_n)}$ at point (**4**) not separated by the pressure joint (see FIG. 1).

Jurisch, as modified, does not discloses a known fixed impedance through which current through the pressure joint flows, and dividing a difference between the two spaced apart voltage measurements by the known fixed impedance.

Ball discloses a known fixed impedance **Rr** through which current **Is** through the pressure joint flows (FIG. 2), and dividing a voltage **Vr** measurement by the known fixed impedance **Rr** (column 4, line 3). The voltage **Vr** can be represented by a difference of two spaced apart voltages $\mathbf{Vr^+}$ & $\mathbf{Vr^-}$. Ball further discloses that one of the first $\mathbf{Vr^+}$ and second voltage $\mathbf{Vr^-}$ measurements is used as one of the two spaced apart voltage measurements.

Therefore, it would have been obvious to a person of ordinary skill in the art to measure the current flowing through the pressure joints by the equation as taught by Ball, in the method of Jurisch, in order to calculate a more accurate current value than can be measured by an ammeter.

3. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jurisch, in view of Vokey et al. and Godo et al., and Ball, as applied to Claims 10-11 above, and further in view of Haun et al., US 6,477,021.

Jurisch discloses measuring at least one of the first voltage $U_s(t_n)$ and the current $I_s(t)$ is performed using devices provided in the power distribution system (see FIG. 1).

Jurisch, as modified, does not disclose group of components comprising: switches, circuit breakers, contactors, network protectors, over-current relays and monitors.

Haun discloses group of components comprising: switches, circuit breakers, contactors, network protectors, over-current relays and monitors (FIG. 1).

Therefore, it would have been obvious for a person of ordinary skill in the art to use components already present in the power distribution system for current and voltage measuring purposes, as taught by Haun, in the method of measuring of Jurisch, in order to minimize the number of components and reducing the complexity of the system.

Allowable Subject Matter

4. Claims 8-9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

As per Claim 8, the prior art fails to teach an impedance measuring method in an energized power distribution system, wherein measurements of the first AC voltage, the

second AC voltage and measurements of the AC current used in generating the summed voltage difference squared and the summed current squared, are selected to eliminate any power factor in the energizing AC power.

As per Claim 9, the prior art fails to teach an impedance measuring method in an energized power distribution system, wherein the selected number of the first AC voltage and the second AC voltage measurements used to generate the summed voltage difference squared and the selected number of AC current measurements used to generate the summed current squared are selected to begin at a zero crossing of the difference between the first and second AC voltage, and a closest zero crossing of the AC current.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Tanaka et al., US 5,764,462, discloses a method of measuring impedance in a power distribution system where the current measurements are repeated, summed, and squared. Tuttle, US 5,189,375, US 5,391,991, US 6,281,685, discloses a method and apparatus for testing impedance in energized power distribution systems.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marina Kramskaya whose telephone number is (571)272-2146. The examiner can normally be reached on M-F 7:00-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on (571)272-2180. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ANJAN DEB
PRIMARY EXAMINER

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